

CLAIMS

What is claimed is:

1. An apparatus comprising:

a first light emitting diode, a second light emitting diode and a third light emitting diode, each of which is aligned in the same approximate direction;

a first reflecting surface positioned to reflect light emitted from the first light emitting diode;

a second reflecting surface positioned to reflect light emitted from the second light emitting diode;

a first filter disposed between the first reflecting surface and the second reflecting surface and configured to reflect the light reflected from the first reflecting surface and to transmit light reflected from the second reflecting surface and the light emitted by the third light emitting diode; and

a second filter disposed between the first reflecting surface and the second reflecting surface and configured to reflect the light reflected from the second reflecting surface and to transmit light reflected from the first reflecting surface and the light emitted by the third light emitting diode;

wherein the first filter and second filter combine the light reflected from the first reflecting surface, the light reflected from the second reflecting surface and the light emitted from the third light emitting diode.

2. The apparatus of Claim 1, the apparatus further comprising a collimator system, the collimator system comprising:

a first collimator associated with the first light emitting diode, the first collimator collimating the light emitted by the first light emitting diode prior to reflecting from the first reflecting surface;

a second collimator associated with the second light emitting diode, the second collimator collimating the light emitted by the second light emitting diode prior to reflecting from the second reflecting surface; and

a third collimator associated with the third light emitting diode, the third collimator collimating the light emitted by the third light emitting diode prior to being transmitted through the first filter and the second filter.

3. The apparatus of Claim 2, the apparatus further comprising:

a frame holding the first reflecting surface, the second reflecting surface, the first filter and the second filter, and the collimator system;

a heatsink, the first light emitting diode, second light emitting diode, and third light emitting diode are mounted on the heatsink, the heatsink mounted to the frame.

4. The apparatus of Claim 1, wherein the first filter and second filter are dichroic filters positioned orthogonally relative to one another.

5. The apparatus of Claim 4, wherein first filter has a front surface and a back surface, and wherein the second filter comprises two halves, a first half having an end that abuts the front surface of the first filter and the second half having an end that abuts the back surface of the first filter.

6. The apparatus of Claim 1, wherein the first filter and second filter are formed from an X-cube prism.

7. The apparatus of Claim 1, the apparatus further comprising a lens configured to receive the combined light from the first filter and the second filter.

8. The apparatus of Claim 1, wherein the first light emitting diode, second light emitting diode and third light emitting diode each emit light of a different color, the colors being red, green and blue.

9. The apparatus of Claim 1, wherein the first light emitting diode, second light emitting diode and third light emitting diode lie within the same plane.

10. The apparatus of Claim 1, the apparatus further comprising a heatsink, wherein the first light emitting diode, second light emitting diode, and third light emitting diode are mounted on the heatsink.

11. The apparatus of Claim 1, the apparatus further comprising:

a fourth light emitting diode and a fifth light emitting diode that are aligned in the same approximate direction as the first light emitting diode, second light emitting diode, and third light emitting diode;

a third reflecting surface positioned to reflect light emitted from the fourth light emitting diode;

a fourth reflecting surface positioned to reflect light emitted from the fifth light emitting diode;

wherein the first filter is further configured to reflect the light reflected from the third reflecting surface and to transmit light reflected from the fourth reflecting surface, and the second filter is further configured to reflect the light reflected from the fourth reflecting surface and to transmit light reflected from the third reflecting surface, and wherein the first filter and second filter combine the light reflected from the first reflecting surface, the light reflected from the second reflecting surface, the light reflected from the third reflecting surface, the light from the fourth reflecting surface and the light emitted from the third light emitting diode.

12. The apparatus of Claim 11, wherein the third reflecting surface is configured to transmit light reflected from the first reflecting surface and the fourth reflecting surface is configured to transmit light reflected from the second reflecting surface.

13. The apparatus of Claim 11, wherein the first light emitting diode, second light emitting diode, third light emitting diode, fourth light emitting diode, and fifth light emitting diode each emit light of a different color, the colors being red, amber, green, cyan, and blue.

14. An apparatus comprising:

a plurality of light emitting diodes positioned along the same plane, each light emitting diode emitting light aligned in the same direction;

a first reflecting surface positioned to reflect light emitted from a first light emitting diode;

a second reflecting surface positioned to reflect light emitted from a second light emitting diode;

a first filter configured to reflect the light emitted from the first light emitting diode after being reflected from the first reflecting surface and being configured to transmit light that is emitted from the third light emitting diode; and

a second filter configured to reflect the light emitted from the second light emitting diode after being reflected from the second reflecting surface and being configured to transmit light that is emitted from the third light emitting diode; wherein the first filter and second filter combine the light emitted by the first light emitting diode, second light emitting diode and third light emitting diode.

15. The apparatus of Claim 14, further comprising a lens configured to receive the combined light from the first filter and the second filter.

16. The apparatus of Claim 15, the apparatus further comprising:

a frame holding the first reflecting surface, the second reflecting surface, the first filter and the second filter, and the lens;

a heatsink, the first light emitting diode, second light emitting diode, and third light emitting diode being mounted on the heatsink, the heatsink mounted to the frame.

17. The apparatus of Claim 16, the apparatus further comprising:

a collimator system comprising:

a first collimator associated with the first light emitting diode;

a second collimator associated with the second light emitting diode; and

a third collimator associated with the third light emitting diode;

wherein the frame further holds the collimator lens system.

18. The apparatus of Claim 14, wherein the first filter and the second filter are disposed between the first reflecting surface and the second reflecting surface.

19. The apparatus of Claim 14, wherein the first filter and second filter are dichroic filters positioned orthogonally relative to one another.

20. The apparatus of Claim 19, wherein first filter has a front surface and a back surface, and wherein the second filter comprises two halves, a first half having an end that abuts the front surface of the first filter and the second half having an end that abuts the back surface of the first filter.

21. The apparatus of Claim 14, wherein the first filter and second filter are formed from an X-cube prism.

22. The apparatus of Claim 14, wherein the first light emitting diode, second light emitting diode and third light emitting diode each emit light of a different color, the colors being red, green and blue.

23. A method comprising:

providing a frame;

mounting a collimator system to the frame, the collimator system including at least three collimators;

mounting a first mirror and a second mirror to the frame, the first mirror positioned to reflect light condensed by a first collimator and the second mirror positioned to reflect light condensed by a second collimator;

mounting a filter system to the frame, the filter system positioned to combine the light condensed by a third collimator with the light reflected by the first mirror and the light reflected by the second mirror; and

mounting a heatsink having at least three light emitting diodes to the frame, wherein mounting the heatsink aligns each of the light emitting diodes with an associated collimator in the collimator system.

24. The method of Claim 23, further comprising mounting the at least three light emitting diodes on the heatsink.
25. The method of Claim 23, wherein mounting a filter system to the frame comprises:
 mounting a first dichroic filter to the frame; and
 mounting second dichroic filter to the frame, the second dichroic filter having a first portion mounted on a first side of the first dichroic filter and a second portion mounted on a second side of the first dichroic filter such that the first dichroic filter and the second dichroic filter are oriented orthogonally to each other.
26. The method of Claim 23, wherein mounting a filter system to the frame comprises mounting an X-cube prism to the frame.
27. The method of Claim 23, further comprising mounting a condenser lens to the frame, the condenser lens positioned to receive the light combined by the filter system.
28. The method of Claim 23, wherein the at least three collimators are lenses integrally formed within the collimator system.
29. The method of Claim 23, wherein a plurality of the light emitting diodes emit different colored light, the colors being red, green and blue.